GEFRAN

GS-L 5 / 10 / 15

POWER SOLID STATE RELAYS WITH LOGIC CONTROL

Main applications

- *Extrusion lines and injection presses for plastics*
- *Hot channels*
- *Thermoforming machines*
- *Packing and packaging machines*
- *Temperature controllers for molds*
- *Electric kilns for ceramics and goldsmith's shop*
- *Machines for the food industry*

Main features

- *Logic signal input control*
- *LED display of logic control state*
- *Switching at voltage zero crossing.*
- *Overvoltage protection*
- *Faston connections*

PROFILE

The GS-L series of solid state power units are miniaturized solid state relays, complete with heatsink, with zero-crossing.
They are available with currents up to 15A, rated voltages 230 VAC and 440 VAC, and input control from VDC logic signal.
All models have been designed to guarantee operation at rated currents, with continuous power, if equipped with an appropriate heatsink.
Their characteristics make them suitable for very short switching times, with millions of operations without wear on components.
The connections are faston type; accessories such as heatsinks and fuses are available.

Warning:
The GS-L models must be used in conjunction with an appropriate heatsink (Accessory).
Installation must precisely observe the warnings contained in the installation notes.

TECHNICAL DATA

General features
Category of use: AC1
Nominal voltage
- 230Vac (max. range 24...253Vac)
- 440Vac (max. range 24..484Vac)
Nominal frequency: 50/60Hz
Non-repetitive voltage:
• 500Vp for model with 230 VAC rated voltage
• 800Vp for model with 440 VAC rated voltage
Zero switching voltage: < 20V
Activation time: =1/2 cycle
Deactivation time: =1/2 cycle
Voltage drop at nominal current : = < 1.4Vrms
Power factor = 1

Control inputs
Max. input: 15mA @32V
Max. reverse voltage: 36Vdc

GS-L 5/10/15
Control voltage: 3...32Vdc
Activation voltage: >2.55Vdc
Deactivation voltage: <1Vdc

OUTPUTS
GS–L 5
Rated current of the device with appropriate heatsink in continuous service 5 A.
Non-repetitive overcurrent t=20 ms: 80A
I^2t for blowout: 45A^2s
dV/dt critical with output deactivated: 500V/µs

GS–L10
Rated current of the device with appropriate heatsink in continuous service:
10 A
Non-repetitive overcurrent t=20 ms: 120A
I^2t for blowout: 100A^2s
dV/dt critical with output deactivated: 500V/µs

GS –L15
Rated current of the device with appropriate heatsink in continuous service:
15 A
Non-repetitive overcurrent t=20 ms: 160A
I^2t for blowout 180A^2s
dV/dt critical with output deactivated: 500V/µs

Isolation
Rated isolation voltage input/output: 2500VAC rms

Thermal characteristics

GS-L 5

Junction temp:	=125°C
Rth junction/case	=2.5 K/W
Rth junction/ambient	=23 K/W

GS-L 10

Junction temp:	=125°C
Rth junction/case	=2.5 K/W
Rth junction/ambient	=23 K/W

GS-L 15

Junction temp:	=125°C
Rth junction/case	=2.5 K/W
Rth junction/ambient	=23 K/W

Calculation of power dissipated from solid state relay

Single-phase solid state relay
Pd=1,6*IRMS [W]
IRMS= single-phase load current

Calculation of thermal resistance of heatsink

Rth= (90°C - T. amb. Max)/Pd
with Pd dissipated power
T. amb. Max. = maximum air temperature in electrical panel.
Use a heatsink with thermal resistance lower than calculated resistance (Rth)

Ambient conditions:

- Working temperature: 0 to 80°C (see the dissipation curves
- Max. relative humidity: 50% to 40°C
- Max. installation altitude: 2000m asl
- Pollution level: 3
- Storage temperature: -20..+85°C
- Internal use

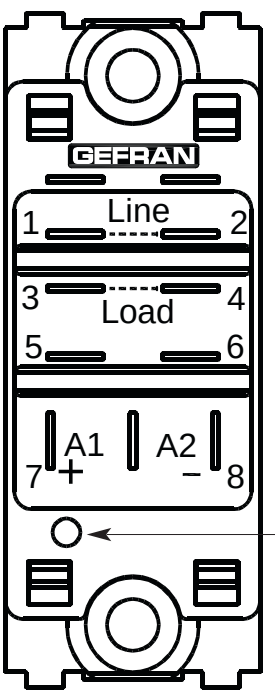
Installation notes

The heatsink must be grounded.
Applications with solid state power units require an automatic safety cutout to disconnect the load power line
Use the high-speed fuse indicated in the catalog according to the connection example.
- Protect the solid state relay against overheating by using an appropriate heatsink (accessory).
The heatsink must be sized in relation to room temperature and load current (see the technical documentation).
- Assembly on the heatsink: the module-heatsink contact surface must have a polarity error of 0.05 mm and maximum roughness of 0.02 mm. The fixing holes on the heatsink must be threaded and countersunk
Attention:
spread 1 gram of thermoconducting silicone putty (DOW CORNING 340 HeatSink is recommended) on the dissipative metal surface of the module.
The surfaces must be clean and the thermoconducting putty must be free of impurities.
Tighten the two fixing screws alternately until reaching a torque of 0.60 Nm. Wait 30 minutes so that any excess putty can run off.
Tighten the two fixing screws alternately until reaching a torque of 1.2 Nm.
We advise you to randomly check proper installation by disassembling the module to make sure there are no air bubbles under the copper plate.

Limits of use

- Dissipation of thermic power on the device with restraints on the ambient temperature of the installation.
- Equipe the cabinet with an external air change or air-condition it, to put out dissipated power.
- Installation restraints (distances to be respected to grant dissipation with natural convection)
- Line transistor max. voltage and derivative limits, for which the solid state relay is equipped with inside safety devices (based on the model).
- Leakage current < 4mA for GS-Ls. (max. value with rated voltage and junction temperature of 125°C).

FACEPLATE DESCRIPTION

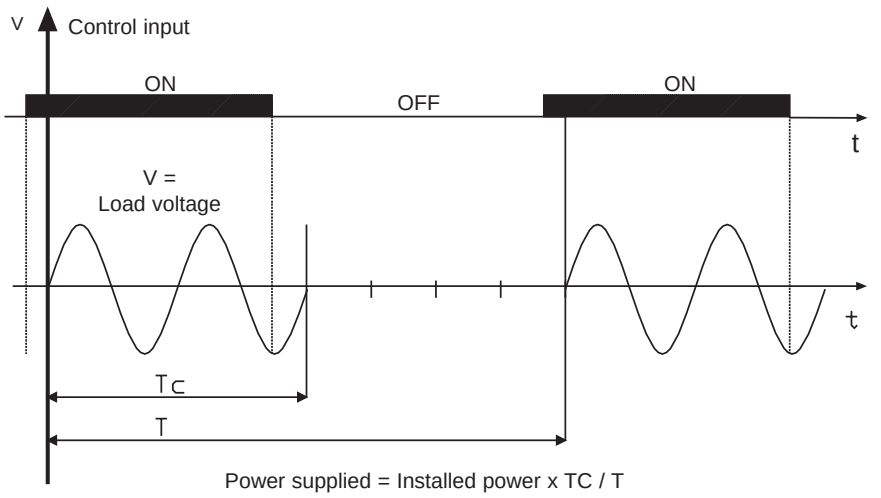


1,2: Line faston connection
3,4: Load faston connection
7: Control signal (-)
8: Control signal (+)

LED display of control state

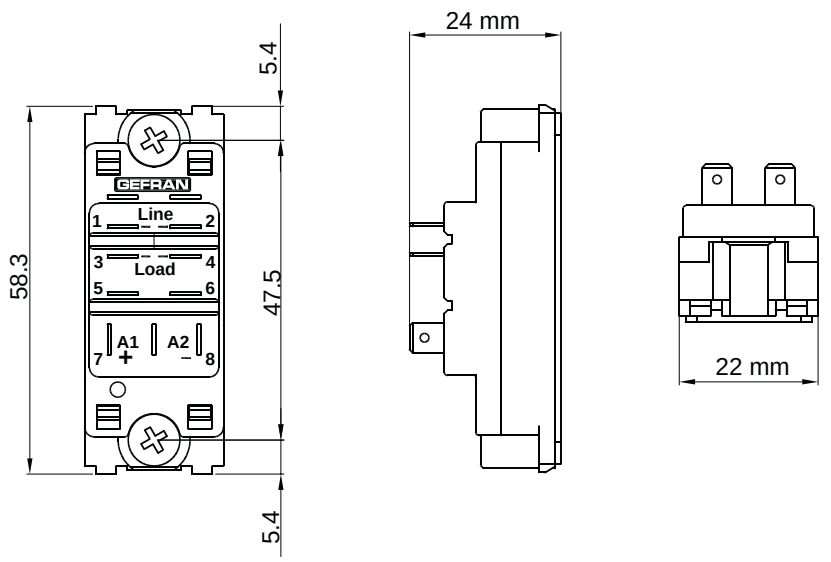
WORKING TYPOLOGY

Voltage logic output control



Power supplied = Installed power x TC / T

MOUNTING DIMENSIONS



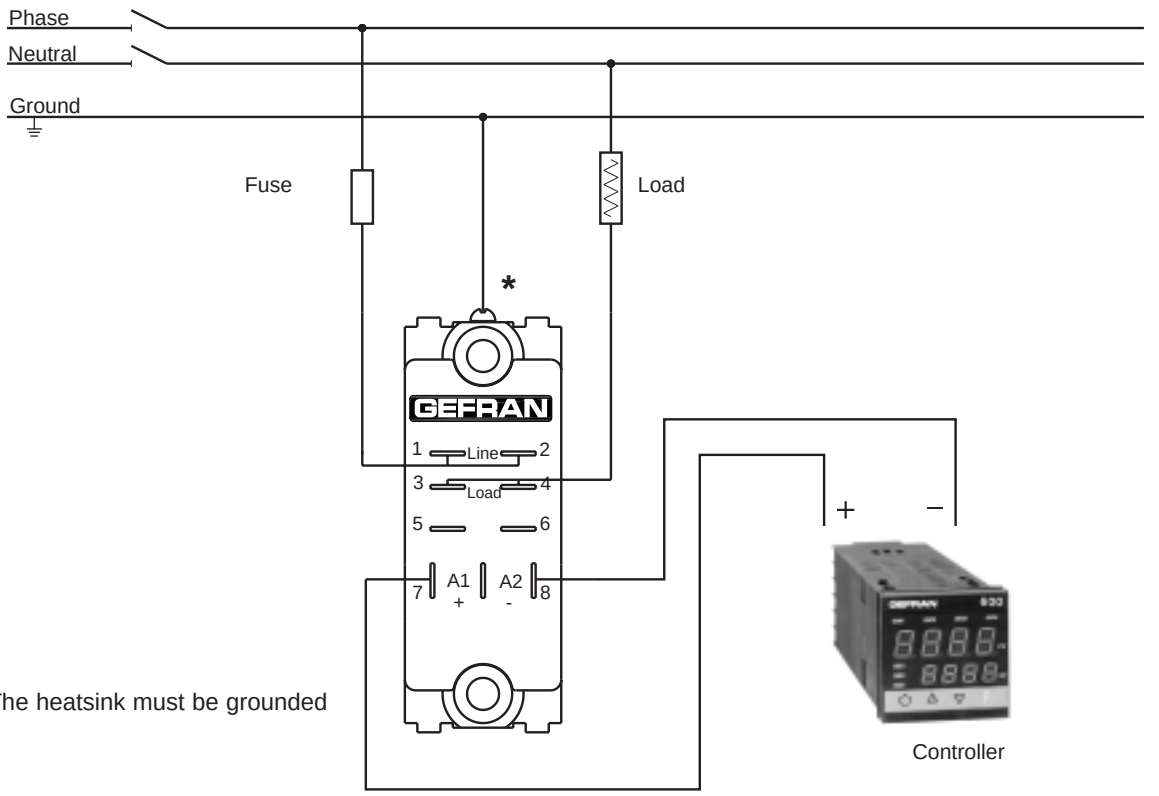
weight = 70 g

SAFETY AND PROTECTIONS

- The heatsink to be used with models GS-L 5/10/15 must be grounded.
- With currents higher than 8 Amps, you have to connect the relay to the line and to the load by connecting both Line (1, 2) and Load (3, 4) terminals in parallel, according to the connection diagrams. The load must be connected by connecting both load terminals in parallel.
- The relay must be protected by an appropriate high-speed fuse suitable for the application with I2t lower than that of the solid state relay.

CONNECTION EXAMPLES

Single-phase connection



* The heatsink must be grounded

For other types of connection (3-phase star with neutral, 3-phase triangle or star without neutral on two phases) refer to the applications of the GS and GTS families of power solid state relays.

TABLE OF TERMINAL AND LEAD CHARACTERISTICS

Size	CONTROL TERMINAL			POWER TERMINAL		
	Contact area (WxD) screw type	Pre-isolated wire terminal	Max. section ** conductor tightening torque	Contact area (WxD) screw type	Pre-isolated wire terminal	Max. section ** conductor tightening torque
5A	-	Faston connector*	2.5mm²	6,4x9	Faston connector*	2.5mm²
10A	-	Faston connector*	2.5mm²	6,4x9	Faston connector*	2.5mm²
15A	-	Faston connector*	2.5mm²	6,4x9	Faston connector*	2.5mm²

(*) Female Faston 4.8 x 0.5 mm
(**)Maximum sections indicated refer to unipolar copper leads isolated in PVC.
(WxD) = width x depth

ACCESSORIES

A wide range of accessories is available, such as fuses and fuse holders, relay bases, panel attachments and DIN guide attachments, thermostats.
To choose accessories, see the section "Solid state relays - Accessories".

ORDER CODE

GS-L [ ] / [ ]

Model	
	GS-L

Nominal current	
5Aac	5
10Aac	10
15Aac	15

Nominal voltage	
230Vac	230
440Vac	440

Please contact GEFRAN personnel for information on availability of codes.

•WARNINGS

WARNING: this symbol indicates danger.

Before installation, please read the following advices:

• follow the indications of the manual scrupulously when making the connections to the instrument.
• use a cable that is suitable for the ratings of voltage and current indicated in the technical specifications.
• if the instrument is used in applications where there is risk of injury to persons and damage to machines or materials, it is essential that it is used with an auxiliary alarm device.
It is advisable to verify frequently that the alarm device is functional even during the normal operation of the equipment.
• The instrument must NOT be used in environments where there could be the presence of dangerous atmospheres (inflammable or explosive).
• During continuous operation, the heatsink may reach 100°C and remain at a high temperature due to thermal inertia even after the device is switched off. Therefore, DO NOT touch the heat sink or the electrical wires.
• do not operate on the power circuit untless the main supply is disconnected.
• DO NOT open the cover if device is “ON”!
(use the holes in the cover for eventual re-calibration).

Installation:

• connect the device to the ground using the proper ground terminal.
• the power supply wiring must be kept separate from that of inputs and outputs of the instrument; always check that the supply voltage corresponds to that indicated on the instrument cover.
• evitare la polvere, l’ umidità, i gas corrosivi, le fonti di calore.
• keep away from dust, humidity, corrosive gases and heat sources.
• The connection cable must be shorter than 3 meters if the current transformer is used.

Maintenance: Check the correct operation of the cooling fans at regular intervals; clean the ventilation air filters of the installation at regular intervals.
• Repairs must be performed only by specialized or appropriately trained personnel. Cut off power to the device before accessing internal parts.
• Do not clean the box with solvents derived from hydrocarbons (trichloroethylene, gasoline, etc.). Using such solvents will compromise the mechanical reliability of the device. To clean external plastic parts, use a clean cloth wet with ethyl alcohol or water.

Technical service : GEFRAN has a technical service department. Defects caused by use not conforming to the instructions are excluded from the warranty.

CE In conformity to ECC 2004/108/CE and 2006/95/CE with reference to standards:
CEI-EN 61000-6-2 (immunity in industrial enviroment) **EN 61000-6-4** (emissions in industrial environments)) **EN 61010-1** (safety requirements).

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